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Advanced Traveler Information Service (ATIS): What do ATIS Customers Want?

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WHAT DO ATIS CUSTOMERS WANT?

OUTLINE

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INTRODUCTION

This is the second of two white papers written for the “ATIS Data Gap” workshop with the objective of providing insights from MMDI Customer Satisfaction ATIS evaluations and other USDOT-sponsored ATIS research. The paper synthesizes findings from research and evaluations dating back to 1996, including several field operational tests. Recent project evaluations are featured more prominently because these projects provided ATIS services to the general public for regular use. This paper draws from MMDI customer satisfaction evaluations of the Puget Sound Traffic Conditions web site, *TrafficTV* in Seattle, Metro Online transit web site in Seattle, TransitWatch® real-time bus departure times at two transit centers in Seattle, *TrafficCheck* traffic television in Tempe, Arizona; and, observations of customer use of the Trailmaster travel conditions web site in Phoenix, and the Transguide travel conditions web site in San Antonio.

There were only two ATIS transit services deployed within the MMDI evaluation time frame. Similarly, there were fewer ATIS transit field operational tests than traffic tests. As a result, more of this paper addresses ATIS traffic customer needs, and less addresses the needs of the transit or multimodal customer.

THE CURRENT CONTEXT FOR ATIS¹ SERVICES

Drivers' point of reference for all traffic information is their personal experience with local traffic conditions and with radio traffic broadcasts. They generally rate their own ability to predict traffic as reliable, and consider radio broadcast traffic information to be unreliable. As a result, some drivers believe that it's impossible to get accurate, useful traffic information. Other drivers believe that there's no alternative to traffic congestion and thus little reason to use any traffic information service.

So, new ATIS services are competing against drivers' personal knowledge of local traffic conditions, traffic broadcasts on the radio, and drivers' underlying belief that there's nothing ATIS could provide to relieve the situation. At the same time, consumers' expectations for advanced information services generally are very high, being conditioned by the Internet, which provides a seemingly endless source of information services, and by a computing environment in which both information services and electronic devices get faster, better, and cheaper quickly.

Despite misgivings about the value of traffic information, most commuters are alert to the possibility of an incident that would require them to re-route. And, there is evidence to suggest that in more congested regions there is greater demand for ATIS. It is common for a commuter to listen to radio or television traffic reports as part of a morning, pre-trip routine, to listen to a radio station that provides traffic information during the trip, and to watch for tell-tale signs of traffic delay along their route. The afternoon commute is more unpredictable than the trip to work in the morning, and so a driver may access a traffic web page before leaving the office (where possible), or otherwise turn on the car radio for the return trip. Where drivers have access to a phone-based traffic information service, customers commonly call when they are planning a trip known for traffic problems, for example a bridge or tunnel bottleneck, or when they encounter congestion en-route.²

In the research and evaluation to date, we see a progression in the expectations and requirements of ATIS customers for more and better quality services, as they become more experienced ATIS consumers. This paper presents findings from both radio traffic information listeners and experienced ATIS customers to highlight the spectrum of customer expectations, and to characterize the way in which customers' expectations of the services grow with experience.

WHY DRIVERS CONSULT ATIS AND HOW THEY USE IT

Drivers consult ATIS to reduce the uncertainty of their trip. They want to lessen the impact of traffic congestion delay and aggravation, and increase their control over time.

¹ For the purposes of this paper, the term "ATIS" is used to refer to the advanced technology forms of traffic information, and "traffic information" is used to refer to generic traffic information, such as radio station broadcast.

² Multisystems Incorporated, et. al, *Evaluation of Phase III of the SmarTraveler Advanced Traveler Information System Operational Test*. Final Report, May 1995. Prepared for Central Transportation Planning Staff, Boston, MA.

In regions with greater amounts of congestion delay, there is likely to be more demand for ATIS. In regions with less congestion, and less uncertainty, there is likely to be less demand. Washington State DOT traffic web site customers consulted the site for five reasons, which are representative of the reasons offered by most ATIS users. They are listed here in order of importance:³

- To assess traffic congestion on their route
- To judge the effects of incidents on their trip
- To decide among alternate routes
- To estimate their trip duration
- To time their trip departure

Drivers who use ATIS report that they regularly change their trip or their expectations based on traffic congestion information. They:

- Change time of departure
- Change part or all of their route of travel, potentially lengthening trip mileage or duration
- Adjust their expectations, listen to an audiotaped book, bring an extra CD, make phone calls, adjust appointments, and make alternative arrangements.

They reported four primary benefits from their use of the web site (in order of importance):

- Saved time
- Avoided congestion
- Reduced stress
- Avoided unsafe conditions

These use patterns, behavioral responses, and benefits are similar among all drivers surveyed as part of the MMDI ATIS evaluations. In the following section, the critical features identified by ATIS customers refer back to the decisions the information supports, and the benefits it provides.

CRITICAL FEATURES OF AN ATIS TRAFFIC SERVICE

The USDOT ITS program fielded qualitative market research in 1996 on various traffic information concepts with drivers in congested regions⁴. While the opinions of these drivers were based on their experience of radio broadcast traffic information, their traffic information concerns have proven to be true of all drivers surveyed since. Survey respondents were (and are) concerned with:

- Accuracy
- Timeliness
- Reliability

³ From May 11 through June 8, 1999, a banner on the WSDOT traffic web site invited users to participate in an on-line survey to help improve the web site. A total of 608 users completed the questionnaire.

⁴ Charles River Associates Incorporated, *User Acceptance of ATIS Products and Services: A Report of Qualitative Research*. U.S. Department of Transportation ITS Joint Program Office, 1997. Twelve focus groups (two in each location) were fielded in New York City, Washington, D.C., Boston, Philadelphia, Los Angeles, and Orange County, CA.

- Cost (capital and operating)
- Degree of decision guidance and personalization
- Convenience (ease of access and speed)
- Safety (of operation)

Surveys of drivers who have had long-term personal experience using ATIS through the web, by telephone, on a prototype in-vehicle device, or on cable television provide a more detailed and informed set of customer requirements. These requirements, which help to define ATIS service quality, are discussed, below.

- ***Camera views***

All respondents value the video camera views displayed on web sites and cable television.⁵ Video camera views provide drivers with the opportunity to exercise their own judgement of the road's conditions. For every service that provided video camera views, survey respondents asked for a time stamp, a clear description of the camera's location, and its direction. Some web site respondents observed that camera images were slow to load on their computers, and others commented that on some sites the cameras were frequently out-of-order. These service problems lessened consumers' interest in using traffic web sites. Respondents also asked for clearer images, especially during inclement weather.

- ***Information on incidents***

Drivers want very detailed and up-to-date information on incidents. They use the information in combination with their own experience of the road network to estimate the intensity and duration of the incident-related traffic congestion. They want to know exactly where the incident occurred, at what time, and the type of incident. They also want to know the impact of the incident on traffic speeds, both on the road where the incident occurred and on adjacent area roads. For services that provide color-coded congestion maps, such as WSDOT, some drivers wanted to see icons indicating that an incident had occurred, and to be able to click on that icon for further details. Others found icons distracting, but wanted to be able to move their cursor over the map, observe whether there were incidents underlying the congestion, and then click for details.

- ***Direct measures of speed for each highway segment, and travel time between user-selected origins and destinations***

When selecting among alternate routes, most drivers want to know which route will get them to their destination most quickly. This suggests that the service provide either time of travel between two points, or direct measures of speed for each highway segment. While many respondents wanted both, the more frequent users of the WSDOT web site rated direct measures of speed as more important. Graphically represented traffic speed and volume were also very important service features to Traffic TV viewers.

⁵ One service provider remarked that when her company added camera views to their web site, usage of the site doubled.

- ***Dynamic route guidance***

Are drivers more interested in receiving dynamic route guidance, or do they prefer advisories of traffic delays that allow them to exercise judgement in selecting an alternate route? There are several answers to this question.⁶ First, in general, women are somewhat more likely to accept dynamic route guidance, while men prefer delay advisories. It appears that most drivers believe that they can select better alternate routes for their local areas than any service could provide. Others prefer to set a delay threshold and receive dynamic route guidance for any traffic event that exceeds their threshold. This is particularly true for drivers who are in unfamiliar areas. Finally, drivers become more accepting of dynamic route guidance if, as they experiment with the dynamic route guidance, they learn that the system provides good advice.

- ***Coverage***

Survey respondents want ATIS coverage of all major freeways and arterials in their region. In regions with HOV lanes and express lanes, customers also want information on those. However, this preference may be a function of the regional road network where the surveys were fielded, and the types of services evaluated. Specifically, in greater Seattle, most of the traffic congestion is on the freeways and major arterials. Further, the services cover primarily freeways, and so the customers would be drivers who found that information useful (and, conversely, not those drivers who commute primarily on local streets). In contrast, drivers in suburban Chicago wanted more information on local streets. The sensible conclusion from this data is to provide traffic information in accordance with local driving patterns, prioritizing coverage by market demand: providing coverage first on those roads that see the greatest congestion.

- ***Timing of information updates***

While the surveys did not explore the exact timing required for traffic condition updates, drivers in Seattle felt that traffic conditions in their region were sufficiently dynamic to justify very frequent updates, particularly along heavily congested roads, during peak traffic hours, and along critical segments, such as the bridges. In Phoenix, web site users complained that camera images, in particular, were not updated frequently enough. Generally, all ATIS customers want to know when the service was last updated, and will use the interval to estimate current traffic conditions.

- ***Mobile ATIS***

Drivers want reliable, accurate, relevant traffic information while driving. For many trips, the traffic information provided pre-trip is outdated when the driver reaches a potential route diversion decision. This is where the greatest demand for ATIS exists. Drivers recognize the safety challenge of delivering information to a driver, and most respondents expressed safety concerns about mobile phone use when driving. Nevertheless, drivers wish they could press an ATIS button when approaching congestion or a route choice and quickly know which route would be least congested.

⁶ Schofer, J.L., F.S. Koppelman, and W.A. Charlton. Perspectives on Driver Preferences for Dynamic Route Guidance Systems. In *Transportation Research Record 1588*, TRB, National Research Council, Washington, D.C., 1997, pp. 26-31.

- ***Local weather conditions***

Weather affects traffic conditions. In Seattle and San Francisco, where microclimates create different weather conditions in neighboring cities, drivers want to know what to expect. In Boston and Minneapolis, severe weather conditions have a profound impact on traffic conditions. Heavy rains affect driving conditions in southern Florida, and dust storms stop traffic in Phoenix. Nearly all drivers surveyed want appropriate, relevant weather conditions included with their traffic information. By comparison, viewers of Traffic TV in Seattle did not want to see satellite images of weather patterns interspersed with the traffic condition information. Weather is another form of incident, and drivers want to know about it when it's there, but do not value the information if there is nothing of significance to report.

- ***User interface and operating characteristics***

User comments on interface and operating characteristics are a function of the platform used to convey the information. Web site users are particularly aware of the multi-dimensional information opportunities presented by the web, and are especially sensitive to the problem of computer and Internet speed. Currently, most web users access the Internet at work and thus have fairly fast connections to web sites. But lack of quick access to the Internet is one reason more commuters don't check the traffic web site in the morning. Slow downloading of images also frustrates web users, whose expectations for computing speed may outstrip the capabilities of the web site's servers, especially if the site's capacity is overburdened at rush hour or during inclement weather. Dedicated users will stay with a web service that is occasionally slow, but marginal users may not.

Both web users and TV viewers require clear and uncluttered visual presentation of information. Traffic congestion maps that use green, amber, and red to suggest traffic speeds are ranked more highly for ease and speed of comprehension. Graphics must be large enough to see easily on television screens of different sizes and resolutions. Most television viewers also wanted the screen image to be supplemented by an audio voice-over description of traffic conditions and suggestions for alternate routes when freeways are congested.

Because phone service users are frequently phoning from the road, they require fast and easy access to information. New voice recognition software that would enable callers to tell the service which road segment or region to describe would be a great improvement over push-button information trees, particularly for drivers. Advertising, which appears on some telephone ATIS services just before the traffic information is provided, interferes with the speed of information delivery and irritates customers.

CRITICAL FEATURES OF AN ATIS TRANSIT SERVICE

Transit customers seek to lower the trip time uncertainty they commonly experience with transit. They want information that increases their control over time and travel decisions. Evaluation findings indicate that transit customers want ATIS services that provide real-time information both pre-trip and en-route, good quality user interface, and convenient access to detailed system information. Most of the suggestions below refer to web site enhancements because one major transit ATIS evaluation was web-based.

- ***Real-time transit information on Web, by phone, at bus stops, and on monitors at malls and office parks near major transit centers***

Transit riders would like more and better information on the location and arrival/departure time of their bus, and on any connecting bus their trip may require. They would like convenient access to the information on a variety of media and at bus stops. Some respondents suggested an abbreviated key sequence for mobile phone users that would connect directly to an automated bus status line, similar to mobile phone services offered for traffic information. Many other respondents felt that it would be useful to have real-time bus information provided on monitors in nearby shopping malls and office buildings.

- ***More sophisticated and detailed Web interfaces***

Transit riders who are Internet users would like to see transit web sites that fully exploit the potential of the web to use multiple information dimensions. Survey respondents complained about two-dimensional sites that do not make better use of the media's capabilities to present information.

- ***Point-to-point itineraries (Web)***

Riders would like to be able to enter origin and destination, whether by point and click on a map, addresses, or landmarks, and receive a detailed, printable transit trip itinerary, including travel time, relevant fares, and schedules.

- ***Point-to-point itineraries for multi-modal trips (Web)***

Similar to the request above for transit trips, riders would also like to receive trip itineraries that incorporate other modes of travel.

- ***Recommended trip times and routes for fastest travel (Web)***

Some transit riders expressed a wish to be able to enter their origin and destination and be told which times of day and which bus routes would get them to their destination fastest.

- ***Detailed maps of routes, with stops, and transfer locations (Web)***

In Seattle, focus groups participants described their difficulty in being able to interpret from a route map or schedule where the bus stopped, and in particular, where to go for the transfer bus. They would like access to more detailed street maps showing exactly where each bus stops.

- ***Secure on-line bus pass purchases (Web)***

Customers would like a secure way to purchase transit passes online, rather than travel to a transit center to purchase passes in person.

ADDITIONAL SUGGESTIONS FROM ADVANCED USERS

The quality and popularity of the WSDOT traffic web site in Seattle created an opportunity to survey a small number of especially advanced ATIS users who made much more intensive use of the site than average customers. These users provided expert

suggestions for web site improvements that are likely to be predictive of the improvements that average customers will seek in the near future. Further, these may represent the type of the improvements that help customers to differentiate between a service that they can access free of charge and services that provide additional value sufficient to merit a fee.

- ***Ramps***

Seattle meters its freeway ramps, and during peak hours some ramps have far greater back-ups than others do. Advanced users would like to choose among possible on-ramps for the shortest possible queue.

- ***Trends***

Advanced users have discovered that one can predict trends based on a time-series sample of current traffic conditions. They accomplish this by repeated checking of conditions over a period of 15 or 30 minutes. They suggest that it would be useful for the service to state whether conditions are currently getting worse, or whether they are improving.

- ***Predictive information***

Predictive information refers to both near-term traffic predictions based on current conditions, and forecast conditions, based on what can be expected on average for certain times of day, days of week, or weather conditions.

Because traffic conditions are dynamic, a route that looked clear at the time of departure may be severely congested 10 or 20 minutes into the trip. Advanced users recommend that ATIS use current information in combination with historic data to provide customers with near-term predictive information on their route conditions, so that drivers can make en-route choices using “current” information and not information that was current at the time they began the trip.

Archived traffic information can forecast traffic conditions, enabling customers to plan ahead. For example, upon approaching the Labor Day weekend, MetroCommute of Greater New York advised its customers to plan on departing the city at 5pm Friday for the best travel times to vacation areas. And, in a retrospective analysis, a 5pm departure from the city provided drivers with the best trip time of the day.

- ***Windows***

Advanced users have observed that there are windows of relatively open travel that appear in traffic congestion, even during peak hours. They would like to see these windows identified by the ATIS service.

- ***Flash major events on the map***

Major events are like incidents in their impact on traffic congestion. Advanced ATIS users would like to be reminded of an impending event with a visual cue on the traffic map, and details provided under the cursor or by double-click. Users in Seattle

suggested, for example, a flashing King Dome icon on evenings when there is an event at that venue.

- ***Parking information***

Seattle is not alone among cities in having insufficient downtown parking to accommodate peak demand. Advanced users would like to know which lots have availability and which are full, to avoid driving around in congestion in search of a space. Some suggested that they would switch modes when parking lots were full. This service would be more valuable to customers if it were coupled with an advanced parking reservation and payment system.

CONCLUSIONS

For a fee-based ATIS service to be successful, it must provide value to the driver every day. It is unlikely that drivers will pay for a service that they consult only when encountering unexpected congestion. The service must be reliable, accurate, and easy to use, because continued customer use is a function of the quality of the information and how it is presented. Even in extremely congested cities, which suggest high levels of consumer demand, low quality ATIS services will be ignored.

Drivers want travel speeds and incidents on their primary and alternate routes at the time of their departure. They also want it later in their trip when they choose between alternate road segments. If the user consults the service before making a trip, the service can provide greater detail on the full regional network. If the user consults the service while en-route, the service must be able to deliver location and route-specific information with minimal distraction to the driver. In both settings, drivers expect to get information quickly and are easily irritated by delays. This is especially a problem during peak congestion hours, when most services are experiencing peak demand and are most likely to slow down.

Based on surveys of current traffic information users, the greatest opportunity for new traffic information services is in the vehicle, whether the service is delivered on a fixed or mobile device. First, in most cities, the greatest need for information is en-route, at a critical junction in the trip. Second, most drivers do not think about traffic information until they are in the car or are encountering congestion en-route. However, as consumers become more experienced with ATIS, it is reasonable to expect that more drivers will make use of ATIS pre-trip.

AFTERWORD

Many people have inquired whether any interesting ideas for enhanced mobile information services arose during the ATIS Customer Satisfaction evaluation. Another frequently asked question is whether other services must be bundled with ATIS for customers to be willing to pay for the service, and/or if advertising-supported services would be acceptable to the ATIS customer? In this section, the author uses the research findings as a basis for speculation about these questions. Observation from the

evaluation does suggest several value-added information services that match travel behavior, location-referencing, and data integration capabilities with individual consumer preferences.

- As many as one-third of ATIS survey respondents who adjusted their travel plans as a result of getting information on traffic delays added stops they would not have otherwise made. Since those stops were probably personal errands, it might have been convenient for the customer to have easy access to location-referenced “to-do” lists. By integrating knowledge of customers’ route options, and their shopping lists and preferred stores, the service can offer both alternate routes and “to-do” items that can be accomplished along these routes.
- Customers might welcome a reminder if there is a sale or special promotion by one of their identified stores when they select a route that includes the venue. This is a form of advertising that does not interfere with delivery of traffic information, and that the customer is likely to consider useful.
- Many commuters have flexibility in the time they arrive home after work. While some survey respondents seem to work later when faced with heavy traffic, others must ask themselves “What else could I be doing with my time?” Ask customers to complete a leisure time or special interests profile. Maintain an up-to-date, location-referenced, entertainment database (movies, shows, games, concerts, and exhibitions). Add a “What’s Happening” button for those heavy traffic days when it’s best to make a new plan.
- Customers would like to be able to reserve and pay for parking in advance at downtown or highly subscribed parking locations. Similar to movie phones that enable customers to purchase movie tickets without standing in lines (and wondering whether the theater will sell-out), this service would eliminate the uncertainty of locating convenient parking during high-demand events.
- Current wisdom suggests that traffic information must be packaged, or bundled, with other information in order to create a commercially attractive product. Certainly the trend in telemedia services is to bundle related information services, both for the convenience of the customer, and for the added value that such bundles create for the provider. However, there is no evidence from public sector evaluations to refute the assertion that travelers who live in highly congested cities, drive during peak congestion periods, and own and use mobile communications media would be interested in subscribing to a high-quality traffic information service.
- For advertising to achieve its intended value, the message must be delivered to an attentive audience. Listeners poised to absorb traffic information are attentive, and thus we have the well-established and profitable radio traffic business model. The drawback, from the listener’s perspective, is that the advertisement interferes with delivery of the needed traffic information, and a delay in delivery of the information may mean a delay in averting traffic congestion. SmarTraveler Boston has inserted

advertising into some of their free pre-recorded traffic reports. No information is available on its effect on caller volume.

The survey of WSDOT Traffic Conditions web site included a question asking whether the customer would object to advertising on the site if the advertisement did not interfere with the site's functionality. While the averaged response was moderate, there were more very strong negative responses than strongly positive responses.

In summary, there is probably a place for advertisement support of ATIS services, but if the advertisements interfere with the quality of the information or with the performance of the service, users will consult the service less frequently than if it were free of advertising.